This listing of claims will replace all prior versions, and listings, of claims in the application.

<u>Listing of Claims:</u>

1. (Cancelled)

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) [The optical device of claim 1, further comprising] <u>An optical device that compensates for polarization mode dispersion (PMD) of an optical signal, comprising:</u>

<u>a first polarization state rotator that rotates the polarization angle of the optical signal in a frequency-dependent manner;</u>

<u>a first-order PMD compensator that receives the rotated signal and compensates for first-order PMD;</u>

<u>a second polarization state rotator that receives the first-order compensated signal and inversely rotates the polarization angle of the first-order compensated signal in a frequency-dependent manner to compensate for higher-order PMD; and</u>

an interferometer disposed between the first polarization state rotator and the second polarization state rotator.

6. (Cancelled)

7. (Currently Amended) [The optical device of claim 1] <u>An optical device that compensates for polarization mode dispersion (PMD) of an optical signal, comprising:</u>

<u>a first polarization state rotator that rotates the polarization angle of the optical signal in a frequency-dependent manner;</u>

a first-order PMD compensator that receives the rotated signal and compensates for first-order PMD; and

a second polarization state rotator that receives the first-order compensated signal and inversely rotates the polarization angle of the first-order compensated signal in a frequency-dependent manner to compensate for higher-order PMD,

wherein the optical device has two adjustable delays.

8. (Cancelled)

9. (Currently Amended) [The optical device of claim 1] An optical device that compensates for polarization mode dispersion (PMD) of an optical signal, comprising:

a first polarization state rotator that rotates the polarization angle of the optical signal in a frequency-dependent manner;

a first-order PMD compensator that receives the rotated signal and compensates for first-order PMD; and

a second polarization state rotator that receives the first-order compensated signal and inversely rotates the polarization angle of the first-order compensated signal in a frequency-dependent manner to compensate for higher-order PMD, wherein a transform is performed according to the equation:

$$M(\omega) = R(\omega)R(\omega K) \left[\begin{matrix} \exp(i\omega\tau/2) & 0 \\ 0 & \exp(i\omega\tau/2) \end{matrix} \right] R^{-1}(\omega K),$$ wherein R is an

operator whose effect is equivalent to rotation in Stokes space, its argument (θ or ωK in the equation above) is a three-dimensional rotation vector whose direction is the axis of rotation in Stokes space and whose angle is the angle of rotation, ω denotes the deviation from a central angular frequency of the optical signal, K (the magnitude of K) and τ relate to adjustable delays.

10. (Previously Amended) In an optical device that compensates for polarization mode dispersion (PMD), a method for adjusting the optical device, comprising the steps of:

adjusting a group delay device to compensate for first order PMD; and

adjusting a device that performs a frequency-dependent polarization rotation in Stokes space to rotate the polarization angle of an optical signal in a frequency dependent manner and to inversely rotate the polarization angle of the optical signal compensated for first-order PMD.

11. (Cancelled)

12. (Original) The method of claim 10, wherein the group delay device includes at least a first adjustable frequency-independent rotating device and a delay τ.

13. (Cancelled)

14. (Original) The method of claim 10, wherein the optical device is adjusted such that the polarization at a center frequency of an optical signal is substantially not changed.

15. (Cancelled)

16. (Cancelled)

17. (Currently Amended) [The method of claim 15] <u>A method for compensating for polarization mode dispersion (PMD) of an optical signal, comprising:</u>

<u>first rotating the polarization angle of the optical signal in a frequency-dependent manner to generate an intermediate optical signal, wherein the first rotating causes a first transformation $\mathbf{R}(\omega\mathbf{K})$ of the optical signal;</u>

<u>compensating the intermediate optical signal for first-order PMD; and</u>

<u>second rotating the polarization angle of the intermediate optical signal in a frequency-dependent manner to compensate for higher-order PMD, wherein the second rotating causes a second transformation $\mathbf{R}^{-1}(\omega\mathbf{K})$, wherein ω denotes the deviation from a central angular frequency of the optical signal and $\mathbf{K}$ relates to a variable delay,</u>

wherein compensating the intermediate optical signal comprises:

splitting the intermediate optical signal into a plurality of portions;

delaying at least one of the portions; and

combining the at least one delayed portion with at least a second portion of the plurality of portions.

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Currently Amended) [The method of claim 15] A method for compensating for polarization mode dispersion (PMD) of an optical signal, comprising:

first rotating the polarization angle of the optical signal in a frequency-dependent manner to generate an intermediate optical signal, wherein the first rotating causes a first transformation $\mathbf{R}(\omega\mathbf{K})$ of the optical signal;

compensating the intermediate optical signal for first-order PMD;

second rotating the polarization angle of the intermediate optical signal in a frequency-dependent manner to compensate for higher-order PMD, wherein the second rotating causes a second transformation $\mathbf{R}^{-1}(\omega\mathbf{K})$, wherein ω denotes the deviation from a central angular frequency of the optical signal and **K** relates to a variable delay,

wherein a transform is performed according to the equation:

$$\mathrm{M}(\omega) = \mathrm{R}(\omega)\mathrm{R}(\omega\mathrm{K}) \left[\begin{matrix} \exp(i\omega\tau/2) & 0 \\ 0 & \exp(i\omega\tau/2) \end{matrix} \right] \mathrm{R}^{-1}(\omega\mathrm{K}),$$ wherein R is an operator whose effect is equivalent to rotation in Stokes space, its argument (θ or ωK in the equation above) is a three-dimensional rotation vector whose direction is the axis of rotation in Stokes space and whose angle is the angle of rotation, ω denotes the deviation from a central angular frequency of the optical signal, K (the magnitude of K) and τ relate to adjustable delays.

23. (Currently Amended) An optical device that compensates for polarization mode dispersion (PMD) of an optical signal, comprising:

a first polarization state rotator that rotates the polarization angle of the optical signal in a frequency-independent manner;

a second polarization state rotator that rotates the polarization angle of the optical signal in a frequency[dependent]-dependent manner;

a first-order PMD compensator that receives the rotated signal and compensates for first-order PMD; and

a third polarization state rotator that receives the first-order compensated signal and inversely rotates the polarization angle of the first-order compensated signal in a frequency-dependent manner to compensate for higher-order PMD.